

## CHAPTER 12. CITY OF ISSAQUAH UPDATE ANNEX

### 12.1 HAZARD MITIGATION PLAN POINT OF CONTACT

#### **Primary Point of Contact**

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#### **Alternate Point of Contact**

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### 12.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation**—1892
- **Current Population**—31,151 as of April 2012
- **Population Growth**—Over the last three decades the City of Issaquah has been a relatively fast growing community with increases in population ranging from 91% between 1980 and 1995, 18% between 1995 and 2000 and 171% between 2000 and 2010. Average annual population increases are expected to continue to grow at 2.59% between 2012 and 2015, 1.67% between 2015 and 2020 and 0.58% between 2020 and 2031. The growth rate is estimated using King County’s projected 0.5 percent annual growth rate from 2011 to 2031 and taking into account the planned developments of the Urban Villages, the Issaquah Highlands, Talus and the Rowley Properties, which are in the development “pipeline.” The population within the City is expected to grow to at least 38,492 by the year 2031. Much of this growth is attributable to the Urban Villages; Issaquah High-lands, Talus, and the Rowley Properties; and to the annexation of North Issaquah, Providence Point/Hans Jensen and the Greenwood Point areas. The population within the remaining Potential Annexation Areas is expected to grow minimally by 2031.
- **Location and Description**—The City of Issaquah is located at the South end of Lake Sammamish fifteen miles east of Seattle. Occupying 11.38 square miles and bisected by Interstate 90; Issaquah covers portions of three mountains, two valleys and a plateau, and includes four major stream systems. The economy of Issaquah includes a mix of retail, office, commercial and some light industry with a number of major employers including Costco and Microsoft. The City of Issaquah is a full service city with its own police department and City-owned and operated water, sewer and storm water utilities. Eastside Fire and Rescue provides fire and medical services.
- **Brief History**—Established in 1892 as a coal mining community and later a timber community, Issaquah has grown to a diverse full service community covering 11.38 square miles and 31,151 people. Much of this growth has occurred since 1990, when the City began annexing several

large areas including Grand Ridge (Issaquah Highlands), East Village (Talus), Providence Point and South Cove/Greenwood Point.

- **Climate**—Issaquah weather is typical of the Puget Sound, Seattle Eastside area with an average 60 inches of rain per year and 11 inches of snowfall. The average number of days with any measurable precipitation is 186 with 154 sunny days per year. The July high is around 75 degrees and the average January low is 36.
- **Governing Body Format**—The City of Issaquah is governed by a seven member City Council elected at large from the general population. An elected Mayor oversees the executive branch of government with the City Administrator responsible for day to day operations. Legislative proposals are brought before the City Council through an Agenda Bill process for review by a Council committee before it is drafted in final form for adoption by either ordinance or resolution by City Council at a public meeting. All City Council committee meetings are open to the public and each agenda provides opportunities for the public to speak to the City Council regarding items on the agenda. Except for confidential information, all emergency management plans and programs are available for public review at City Hall, the local libraries and the City's web site. The Issaquah City council will assume responsibility for the adoption of this plan and Emergency Management Director will oversee its implementation.
- **Development Trends**—As growth and development have expanded in the Pacific Northwest; Issaquah has emerged as leader in innovative Sustainable Development practices. A sustainable community creates a system that supports the proper functioning of the natural environment and recognizes the interconnected need for social and economic vitality. Sustainable Development policies provide the quantifiable measures needed to reduce local greenhouse gas emissions and enhance urban livability through the environment, economic vitality and social equity. From Issaquah's renowned Salmon Days and the City's efforts to restore viable salmon habitat, to the development of a Sustainable Building Program, Issaquah has demonstrated leadership in Sustainable Development and should continue in the pursuit of these goals. The City of Issaquah pursues the type of growth and development patterns that support and complement the community's quality of life. For example, over the next 20 years, the City will provide incentives to concentrate new growth in the mixed use areas throughout Issaquah such as the Olde Town's Cultural Business District and the Central Issaquah area. Where land supply is unavailable due to build out or development constraints, or if transportation concurrency cannot be met, growth must be accommodated in appropriate Potential Annexation Areas. Issaquah intends to phase development to occur first in areas where the City can provide services and facilities in a timely and efficient manner. Focusing development into specific activity areas can also protect sensitive and critical areas and prevent the conversion of undeveloped land into sprawling, under-utilized land. Policies require infrastructure and transportation improvements are available as development occurs; the establishment, improvement and adherence to building and design standards; and the completion of subarea plans to address the more individual sectors of the City.

## **12.3 CAPABILITY ASSESSMENT**

The assessment of the jurisdiction's legal and regulatory capabilities is presented in Table 12-1. The assessment of the jurisdiction's fiscal capabilities is presented in Table 12-2. The assessment of the jurisdiction's administrative and technical capabilities is presented in Table 12-3. Information on the community's National Flood Insurance Program (NFIP) compliance is presented in Table 12-4. Classifications under various community mitigation programs are presented in Table 12-5.

**TABLE 12-1.  
LEGAL AND REGULATORY CAPABILITY**

	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
<b>Codes, Ordinances &amp; Requirements</b>					
Building Code	Yes	Yes	No	Yes	Issaquah Municipal Code (IMC) Title 16. IBC. Updated 2012
Zoning	Yes	Yes	No	Yes	IMC Title 18. Updated 9/16/13
Subdivisions	Yes	Yes	No	Yes	IMC Title 18.13. Updated 9/16/13
Stormwater Management	Yes	Yes	No	Yes	IMC Title 13.28 1/31/2011 Stormwater Management Policy
Floodplain Management	Yes	Yes	Yes	Yes	IMC Title 16.36 3/21/2005 Areas of Special Flood Hazard
Post Disaster Recovery	Yes				CEMP 2011
Real Estate Disclosure	No	No	Yes	Yes	Washington State Disclosure Law (RCW 64.06)
Growth Management	Yes	Yes	Yes	Yes	Comp Plan. Updated 12/17/12
Site Plan Review	Yes	Yes	No	Yes	IMC 18.4. Updated 9/16/13
Public Health and Safety	No	Yes	Yes	Yes	King County Public Health
Environmental Protection	Yes	Yes	Yes	Yes	IMC 18.10. Updated 2/13.
<b>Planning Documents</b>					
General or Comprehensive Plan	Yes			Yes	Comp Plan adopted 1995, amended 12/17/12.
<i>Is the plan equipped to provide linkage to this mitigation plan?</i>					Yes
Floodplain or Basin Plan	Yes	No	Yes	Yes	Issaquah Creek Basin & Non-Point Action Plan adopted Resolution 95-12. Adopted 1995
Stormwater Plan	Yes	No	No	Yes	Stormwater Management Plan adopted Resolution No. 2004-08. Adopted 2004
Capital Improvement Plan	Yes			Yes	2014 Annual
<i>What types of capital facilities does the plan address?</i>					All capital projects within the City.
<i>How often is the plan revised/updated?</i>					Annually
Habitat Conservation Plan	Yes	No	No	No	Comp Plan. Updated 12/17/12
Economic Development Plan	No	No	No	No	In Process. Expected summer of 2014.
Shoreline Management Plan	Yes	No	No	Yes	IMC 18.10. Updated 2/13
Community Wildfire Protection Plan	No	No	No	No	

**TABLE 12-1.  
LEGAL AND REGULATORY CAPABILITY**

	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
<b>Response/Recovery Planning</b>					
Comprehensive Emergency Management Plan	Yes	No	No	Yes	Promulgated 2012
Threat and Hazard Identification and Risk Assessment	Yes	No	No	Yes	2009 Resolution
Terrorism Plan	No	No	Yes	No	King County OEM
Post-Disaster Recovery Plan	No	No	No	No	
Continuity of Operations Plan	No	No	No	No	Some Continuity of Operations Plan issues addressed in Pandemic Flu Plan. 2008.
Public Health Plans	NA	No	No	No	

**TABLE 12-2.  
FISCAL CAPABILITY**

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	Yes
Withhold Public Expenditures in Hazard-Prone Areas	No
State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes
Other	Real Estate Excise Tax; King County Flood Control District-Basin Opportunity Fund

**TABLE 12-3.  
ADMINISTRATIVE AND TECHNICAL CAPABILITY**

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Development Services Department/Senior Planner, Senior Engineer
Engineers or professionals trained in building or infrastructure construction practices	Yes	Development Services Department/Senior Engineer Public Works Engineering/ Senior Engineer
Planners or engineers with an understanding of natural hazards	Yes	Development Services Department/ Environmental Planner
Staff with training in benefit/cost analysis	Yes	Public Works Engineering/ Senior Engineer
Surveyors	Yes	On contract
Personnel skilled or trained in GIS applications	Yes	Public Works Engineering/ GIS Coordinator
Scientist familiar with natural hazards in local area	Yes	On contract
Emergency manager	Yes	Public Works Operations/ Emergency Management Director
Grant writers	Yes	Mayor's Office/ Grant Coordinator

**TABLE 12-4.  
NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE**

What department is responsible for floodplain management in your community?	Public Works Engineering
Who is your community's floodplain administrator? (department/position)	Public Works Engineering/ Surface Water Manager
Do you have any certified floodplain managers on staff in your community?	No
What is the date of adoption of your flood damage prevention ordinance?	1980
When was the most recent Community Assistance Visit or Community Assistance Contact?	2007
To the best of your knowledge, does your community have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your community? (If no, please state why)	Yes
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No
Does your community participate in the Community Rating System (CRS)? If so, is your community seeking to improve its CRS Classification? If not, is your community interested in joining the CRS program?	Yes (Class 5), Yes.

**TABLE 12-5.  
COMMUNITY CLASSIFICATIONS**

	Participating?	Classification	Date Classified
Community Rating System	Yes	5	10/01/12
Building Code Effectiveness Grading Schedule	Yes	2	Not available
Public Protection	Yes	4	Not available
StormReady	No	N/A	N/A
Firewise	No	N/A	N/A
Tsunami Ready (if applicable)	No	N/A	N/A

## 12.4 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 12-6 lists all past occurrences of natural hazards within the jurisdiction. Repetitive flood loss records are as follows:

- Number of FEMA-Identified Repetitive Loss Properties: 23
- Number of FEMA-Identified Severe Repetitive Loss Properties: 4
- Number of Repetitive Flood Loss/Severe Repetitive Loss Properties Known to Have Been Mitigated: 1

## 12.5 HAZARD RISK RANKING

Table 12-7 presents the ranking of the hazards of concern. Hazard area extent and location maps are included at the end of this chapter. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes.

## 12.6 STATUS OF PREVIOUS PLAN INITIATIVES

Table 12-8 summarizes the initiatives that were recommended in the previous version of the hazard mitigation plan and their implementation status at the time this update was prepared.

## 12.7 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED INITIATIVES

Table 12-9 lists the initiatives that make up the jurisdiction's hazard mitigation plan. Table 12-10 identifies the priority for each initiative. Table 12-11 summarizes the mitigation initiatives by hazard of concern and the six mitigation types.

**TABLE 12-6.  
NATURAL HAZARD EVENTS**

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment <sup>a</sup>
Winter Weather/ Ice	4056	1/19/2012	\$545,000
Flooding	--	12/12/2010	\$86,000
Flooding	1817	1/6/2009	\$213,000
Winter Weather/ Snow	1825	12/12/2008	\$613,000
Flooding	1734	12/1/2007	\$103,000
High Winds	1682	12/14/2006	\$122,000
Flooding	1671	11/2/2006	\$35,000
Flooding		12/16/2001	\$15,000
Earthquake	1361	2/28/2001	\$1,057,364
Flooding	1100	2/9/1996	\$20,000
High Winds	981	1/20/1993	\$80,000
Flooding	883	11/9/1990	\$45,000
Flooding	852	1/6/1990	\$175,000
Flooding	784	11/22/1986	\$50,000
Flooding	757	1/16/1986	\$30,000
Volcano	623	5/21/1980	\$5,000
Flooding	492	12/13/1975	\$20,000

a. Estimates are for public damage only. FEMA payout for flood insurance claims within the City during 1978-2011 was approximately \$3.9 million, in addition to the above estimates.

**TABLE 12-7.  
HAZARD RISK RANKING**

Rank	Hazard Type	Risk Rating Score (Probability x Impact)
1	Earthquake	32
2	Wildfire	32
3	Landslide	27
4	Severe Winter Weather	27
5	Severe Weather	26
6	Flood	18
7	Volcano	9
8	Dam Failure	6
9	Avalanche	0
10	Tsunami	0

**TABLE 12-8.  
PREVIOUS ACTION PLAN IMPLEMENTATION STATUS**

Action #	Action Status			Comments
	Completed	Carry Over to Plan Update	Removed; No Longer Feasible	
IQ-1	✓			Highwood reservoirs received retrofitting in 2011 and the Cemetery reservoirs were retrofitted in 2012.
IQ-2		✓		Now IQ-3
IQ-3	✓			Project completed by Public Works in October 2011.
IQ-4	✓			Six single-family homes elevated in 2010 and 2011. This includes three repetitive loss properties and one severe repetitive loss property.
IQ-5	✓	✓		City sponsors at least two CERT classes annually and offers Map Your Neighborhood facilitator training to CERT graduates and conducts ongoing Map Your Neighborhood meetings. This is an ongoing annual program.

**TABLE 12-9.  
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline	Included in Previous Plan?
<b>Initiative #IQ-1</b> —Continue to maintain compliance and good standing under the National Flood Insurance Program. This will be accomplished through the implementation of floodplain management programs that, at a minimum, will meet the minimum requirements of the NFIP, which include the following: <ul style="list-style-type: none"> <li>• Enforcement of the adopted flood damage prevention ordinance,</li> <li>• Participating in floodplain identification and mapping updates, and</li> <li>• Providing public assistance/information on floodplain requirements and impacts</li> </ul>							
New and existing	Flood	2,4,5,9,10, 12	Public Works	Low	General Fund	Ongoing	No
<b>Initiative #IQ-2—Replace Mt Park Pump Station.</b> Construct a new concrete earthquake resistant structure on same site as the existing pump station, demolish the old building and replace pumps and electrical equipment. Upgrade pumps to provide additional fire flow capacity.							
Existing	Earthquake	1,5,8	Public Works	Low	Water Fund	2014	No
<b>Initiative #IQ-3—Replace Mt Hood Pump Station.</b> Mount Hood pump station is a cinder block building constructed in 1977 which houses two 450 gpm pumps lifting water about 190 feet. The seismic hazard evaluation study concluded that the building has vulnerability. Should the station be damaged the upper Squak mountain area would be without water. The pump station should be replaced with a new earthquake resistant concrete building with larger and more efficient pumps and motors, electronics, and security systems.							
Existing	Earthquake	1,5,8	Public Works	Low	Water Fund	2015	Yes



**TABLE 12-9.  
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline	Included in Previous Plan?
<b>Initiative #IQ-4—Replace Forest Rim Pump Station.</b> Due to seismic issues, the station could be damaged and the upper Squak mountain area would be without water. The existing pump station is a cinder block building constructed in 1979 which houses two 300 gpm pumps lifting water about 300 feet. The pump station should be replaced with a new earthquake resistant concrete building with new more efficient pumps, motors, electronics, and security systems.							
Existing	Earthquake	1,5,8	Public Works	Low	Water Fund	2017	No
<b>Initiative #IQ-5—Emergency Portable Drinking Water Equipment.</b> The emergency water fill station would serve as a public access to drinking water in events where normal water distribution is interrupted: from water main breaks to catastrophic, system-wide interruptions. The project will also purchase a stock of plastic, sealed, sterile five-gallon water containers; the containers, when new, are compressed flat and are fitted with a secure and sterile filling attachment that connects to the filling ports of the station.							
New	Earthquake, Flood, Landslide	8	Public Works	Medium	Water Fund	2017	No
<b>Initiative #IQ-6—CERT/ Map Your Neighborhood Program</b> More than 500 citizens have been involved in Issaquah's CERT and Medical Reserve Corps programs since the group started in 2005. Nearly 100 have applied to become credentialed Emergency Workers and active volunteers during incidents including flooding. In addition, more than 12 percent of residential parcels in Issaquah are Map Your Neighborhood trained, meaning the neighbors have plans in place to help each other during emergencies and disasters.							
Existing	All Hazards	5,6,8	Emergency Management	Low	General Fund	Ongoing	Yes
<b>Initiative #IQ-7—Replace Anti-Aircraft Creek Culvert.</b> The problem with this culvert was originally caused when the Summerhill subdivision was built, which relocated the creek with a 90-degree bend just upstream of Newport Way. The 1996 Issaquah Creek Basin Plan recommended that this problem be fixed. Significant rainfall events on Cougar Mountain in the last few years have renewed interest in fixing this problem, which creates a significant hazard to motorists. Most large rainfall events require a costly cleanup effort by Public Works Operations (the December 2010 event alone cost \$30,000)							
Existing	Flooding	1,12	Public Works	Low	Stormwater Fund/ FEMA grant	2015	No
<b>Initiative #IQ-8-Continuity of Operations/ Government Plan.</b> Prepare a continuity of operations and a continuity of government plan for the City of Issaquah.							
New	All Hazards	1,5	Emergency Management	Medium	General and Utility Funds	2017	No
<b>Initiative #IQ-9-</b> Continue to maintain/enhance the City's status under the Community Rating System (CRS) program.							
New and Existing	Flood	2,4,5,9,10, 12	Public Works	Low	Stormwater Fund	Ongoing	No

**TABLE 12-9.  
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline	Included in Previous Plan?
<b>Initiative #IQ-10</b> —Integrate the hazard mitigation plan into other plans, ordinances or programs to dictate land uses within the jurisdiction.							
New	All Hazards	2,4,8,10	Development Services	Low	General Fund	Short-term	No
<b>Initiative # IQ-11</b> —Where appropriate, support retrofitting, purchase, or relocation of structures located in hazard-prone areas to protect structures from future damage, with properties with exposure to repetitive losses as a priority. This includes redevelopment of flood-prone commercial areas in downtown Issaquah that were constructed prior to establishment of floodplain development standards. In 2014 the Gilman Square area, which has two repetitive loss properties, will be redeveloped by the property owner. Two repetitive loss properties will be eliminated. This property is the source of nearly 50% of historic flood insurance claims in Issaquah. This will mitigate the repetitive loss properties.							
Existing	All Hazards	5,9,13	Public Works	High	FEMA grants, Local sources for local Match	Long-term	No
<b>Initiative # IQ-12</b> —Continue to support the county-wide initiatives identified in this plan.							
New and Existing	All Hazards	4,6,11,12,1 3, 14, 15	City of Issaquah	Low	General Fund	Ongoing	No
<b>Initiative # IQ-13</b> —Actively participate in the plan maintenance strategy identified in this plan.							
New and Existing	All Hazards	4,6,11,12,1 3, 14, 15	City of Issaquah	Low	General Fund	Ongoing	no

**TABLE 12-10.**  
**MITIGATION STRATEGY PRIORITY SCHEDULE**

Initiative #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/ Budgets?	Priority <sup>a</sup>
1	6	High	Low	Yes	Yes	Yes	High
2	3	High	Low	Yes	No	Yes	High
3	3	High	Low	Yes	No	Yes	High
4	3	High	Low	Yes	No	Yes	High
5	2	High	Medium	Yes	Yes	No	Medium
6	1	High	Low	Yes	Yes	Yes	High
7	3	High	Low	Yes	Yes	Yes	High
8	2	High	Medium	Yes	Yes	No	Medium
9	6	Medium	Low	Yes	No	Yes	High
10	5	Medium	Low	Yes	No	Yes	High
11	3	High	High	Yes	Yes	No	Medium
12	7	Medium	Low	Yes	No	Yes	High
13	7	Low	Low	Yes	Yes	Yes	High

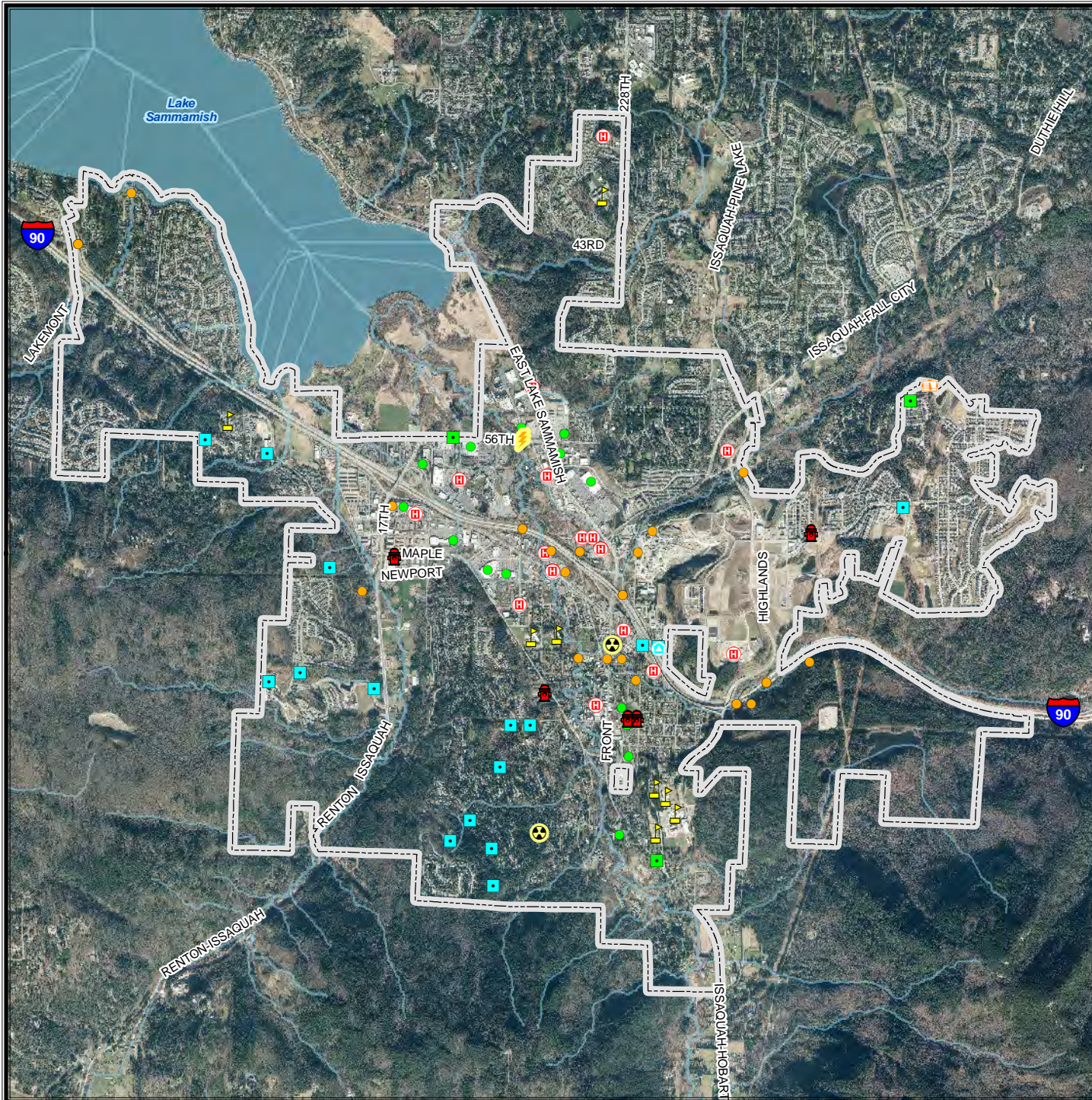
a. See Introduction for explanation of priorities.

**TABLE 12-11.**  
**ANALYSIS OF MITIGATION INITIATIVES**

Hazard Type	Initiative Addressing Hazard, by Mitigation Type <sup>a</sup>					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Avalanche	--	--	--	--	--	--
Dam Failure	8,10,13	11	6,12	10	12	
Earthquake	8,10,13	11	6,12	10	5,12	2,3,4
Flood	1,8,9,10,13	1,7,9,11	1,6,9,12	1,9, 10	1,5,9,12	9
Landslide	8,10,13	11	6,12	10	5,12	
Severe Weather	8,10,13	11	6,12	10	12	
Severe Winter Weather	10,13	11	12	10	12	
Tsunami	--	--	--	--	--	--
Volcano	8,10,13	11	6,12	10	12	
Wildfire	8,10,13	11	6,12	10	12	

a. See Introduction for explanation of mitigation types.


















# CITY OF ISSAQUAH

## Critical Facilities and Infrastructure

### Critical Facilities

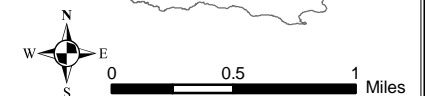
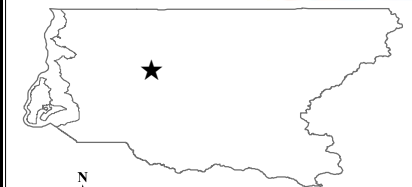
-  Government Function
-  HazMat
-  Medical Care
-  Protective Function
-  Schools
-  Other Facility

### Critical Infrastructure

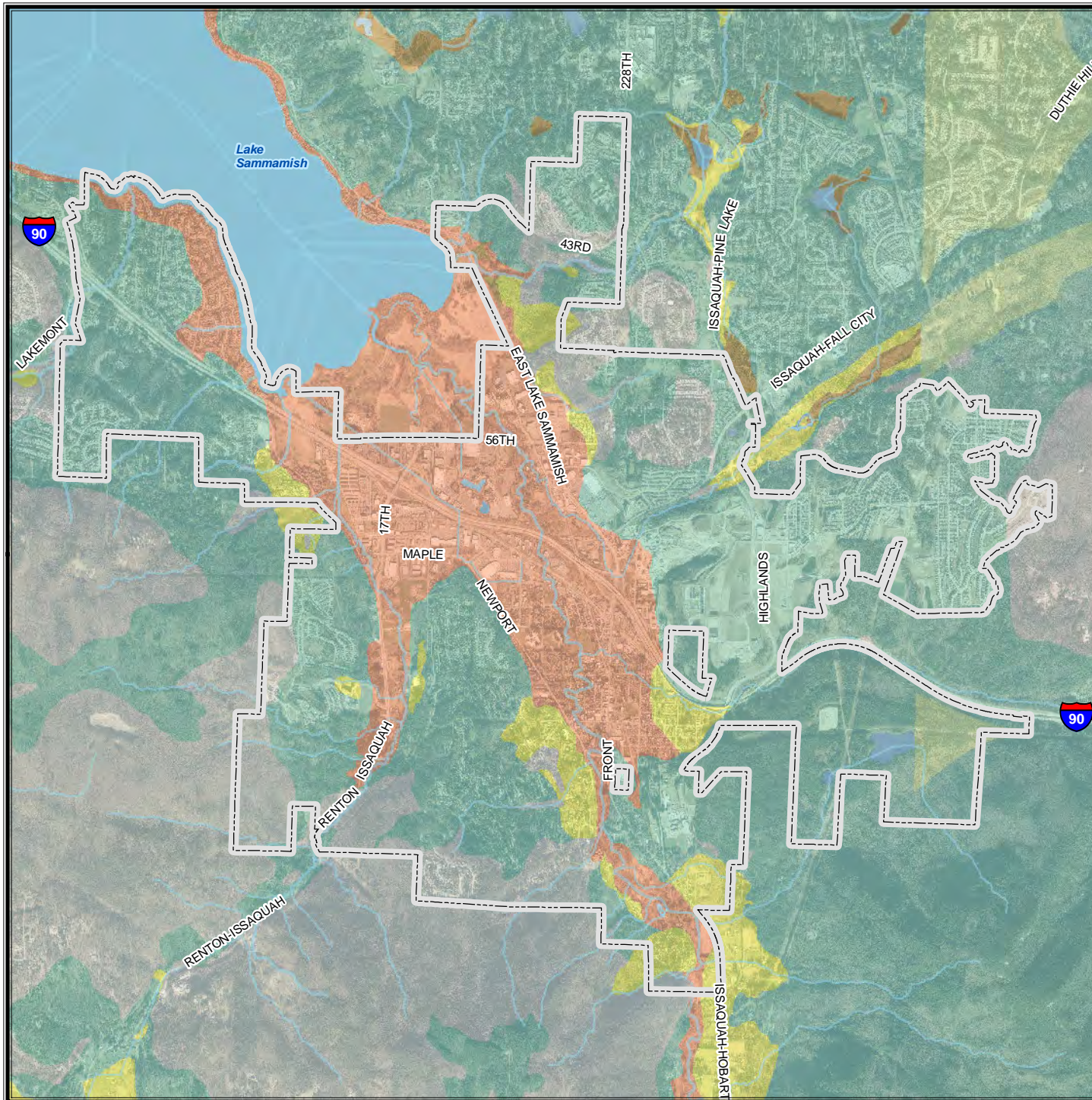
-  Bridges
-  Communications
-  Dams
-  Water Supply
-  Power
-  Transportation
-  Wastewater

Locations are approximate.

Base Map Data Sources:  
King County, U.S. Geological Survey







# CITY OF ISSAQUAH

## Liquefaction Susceptibility

Susceptible	Not Susceptible
High	Bedrock
Moderate to High	Peat
Moderate	Water
Low to Moderate	Ice
Low	
Very Low to Low	
Very Low	

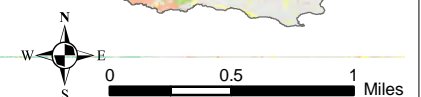
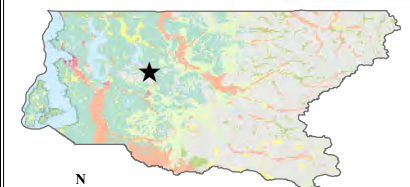
Liquefaction data provided by the Washington State Department of Natural Resources, Division of Geology and Earth Resources. Data is based solely on surficial geology published at a scale of 1:100,000.

A liquefaction susceptibility map provides an estimate of the likelihood that soil will liquefy as a result of earthquake shaking. This type of map depicts the relative susceptibility in a range that varies from very low to high. Areas underlain by bedrock or peat are mapped separately as these earth materials are not liquefiable, although peat deposits may be subject to permanent ground deformation caused by earthquake shaking.

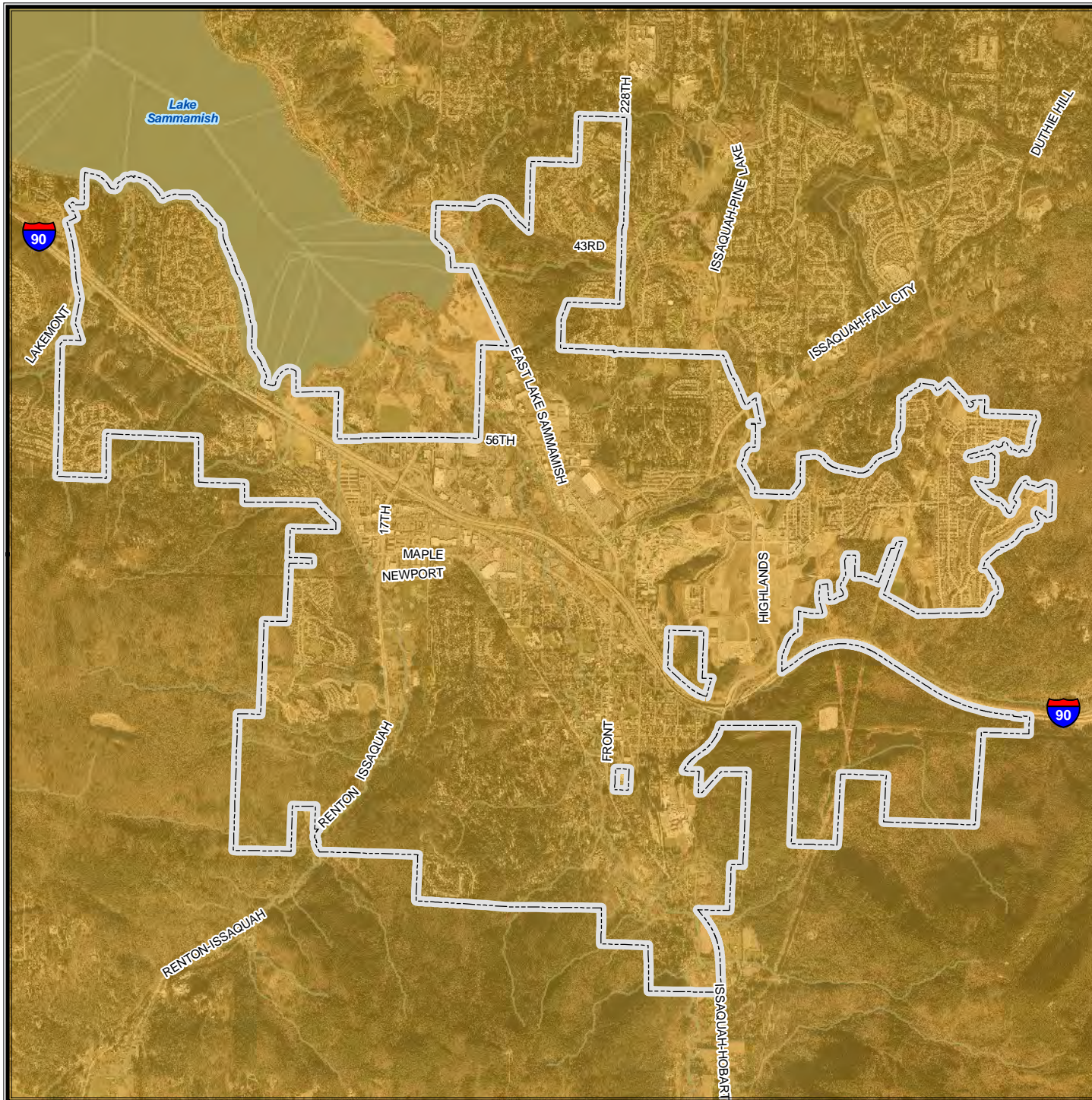
Base Map Data Sources:  
King County, U.S. Geological Survey

 King County

 TETRA TECH







# CITY OF ISSAQUAH

## Seattle M7.2 Scenario Peak Ground Acceleration

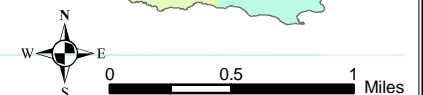
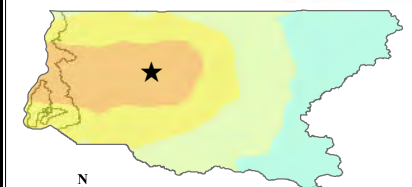
### Mercalli Scale, Potential Shaking

- I (Not Felt)
- II - III (Weak)
- IV (Light)
- V (Moderate)
- VI (Strong)
- VII (Very Strong)
- VIII (Severe)
- IX (Violent)
- X+ (Extreme)

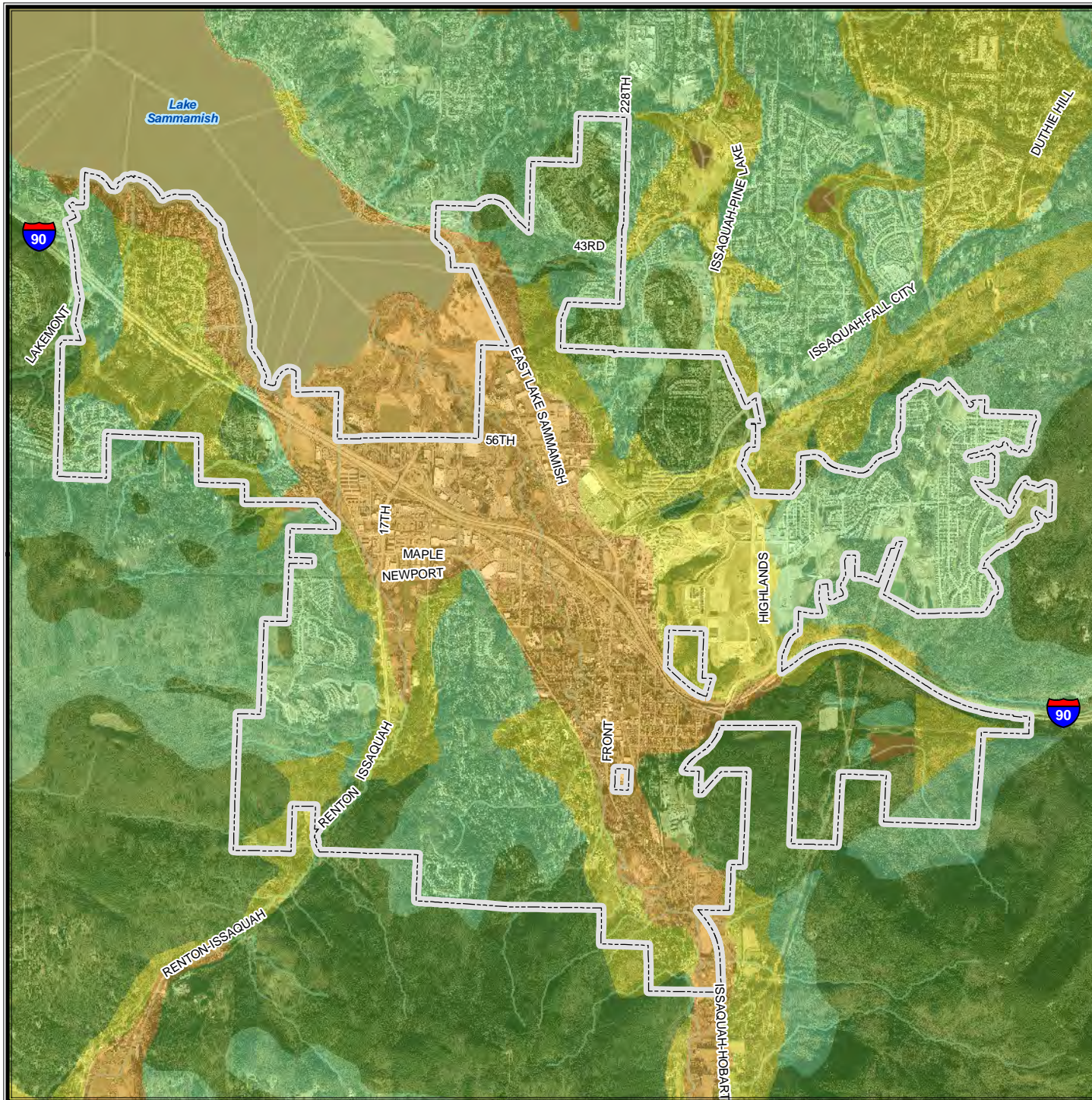
Magnitude: 7.2  
Epicenter: N47.52 W122.37

A ShakeMap is designed as a rapid response tool to portray the extent and variation of ground shaking throughout the affected region immediately following significant earthquakes. Ground motion and intensity maps are derived from peak ground motion amplitudes recorded on seismic sensors (accelerometers), with interpolation based on both estimated amplitudes where data are lacking, and site amplification corrections. Color-coded instrumental intensity maps are derived from empirical relations between peak ground motions and Modified Mercalli intensity.

Base Map Data Sources:  
King County, U.S. Geological Survey







# CITY OF ISSAQUAH

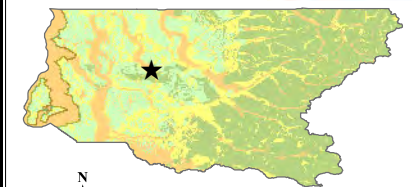
## National Earthquake Hazard Reduction Program (NEHRP) Soil Classification

- Site Class B - Rock
- Site Class C - Very Dense Soil, Soft Rock
- Site Class D - Stiff Soil
- Site Class E - Soft Soil

Soil classification data provided by Washington State Department of Natural Resources, Geology and Earth Resources Division.

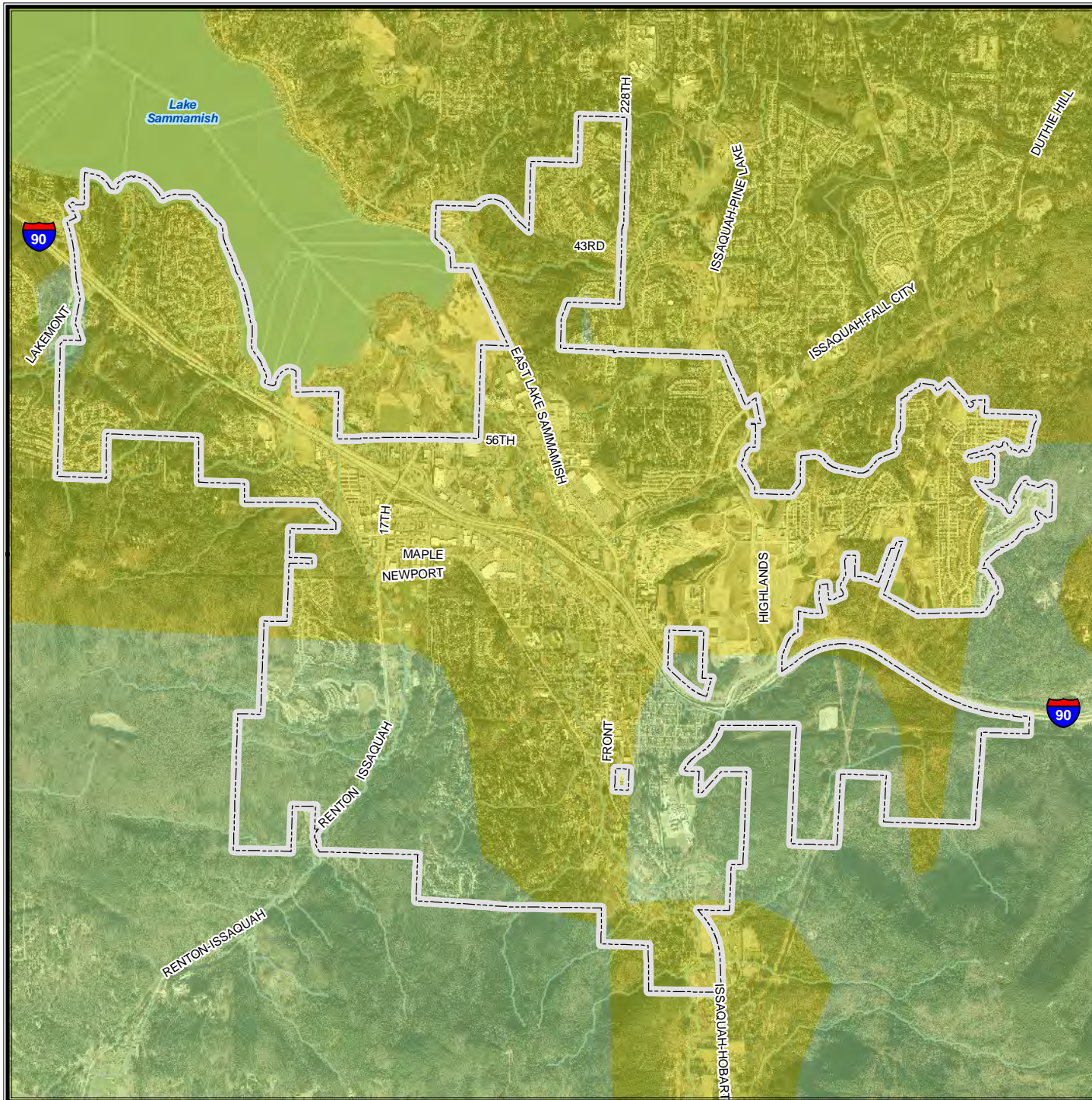
The dataset identifies site classes for approximately 33,000 polygons derived from the geologic map of Washington. The methodology chosen for developing the site class map required the construction of a database of shear wave velocity measurements. This database was created by compiling shear wave velocity data from published and unpublished sources, and through the collection of a large number of shear wave velocity measurements from seismic refraction surveys conducted for this project. All of these sources of data were then analyzed using the chosen methodologies to produce the statewide site class maps.

Base Map Data Sources:  
King County, U.S. Geological Survey



0 0.5 1 Miles





# CITY OF ISSAQUAH

## South Whidbey M7.4 Scenario Peak Ground Acceleration

### Mercalli Scale, Potential Shaking

- I (Not Felt)
- II - III (Weak)
- IV (Light)
- V (Moderate)
- VI (Strong)
- VII (Very Strong)
- VIII (Severe)
- IX (Violent)
- X+ (Extreme)

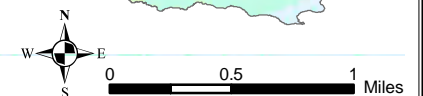
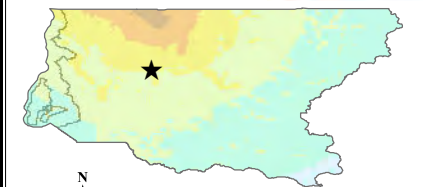
Magnitude: 7.4  
Epicenter: N48.05 W122.47

A ShakeMap is designed as a rapid response tool to portray the extent and variation of ground shaking throughout the affected region immediately following significant earthquakes. Ground motion and intensity maps are derived from peak ground motion amplitudes recorded on seismic sensors (accelerometers), with interpolation based on both estimated amplitudes where data are lacking, and site amplification corrections. Color-coded instrumental intensity maps are derived from empirical relations between peak ground motions and Modified Mercalli intensity.

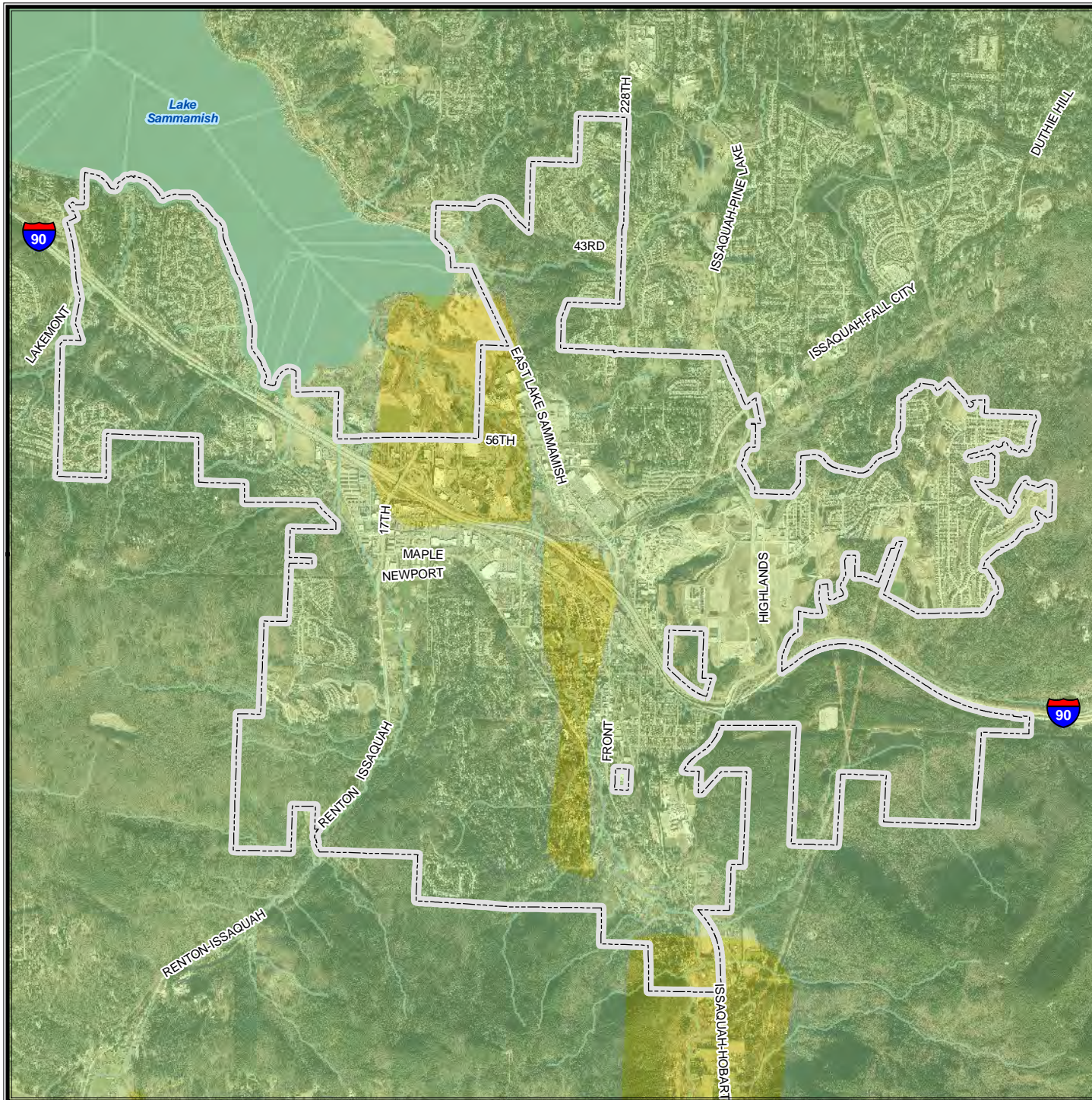
Base Map Data Sources:  
King County, U.S. Geological Survey

 King County

 TETRA TECH







# CITY OF ISSAQUAH

## Tacoma M7.1 Scenario Peak Ground Acceleration

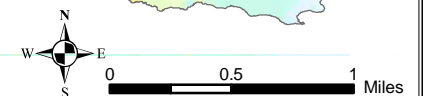
### Mercalli Scale, Potential Shaking

- I (Not Felt)
- II - III (Weak)
- IV (Light)
- V (Moderate)
- VI (Strong)
- VII (Very Strong)
- VIII (Severe)
- IX (Violent)
- X+ (Extreme)

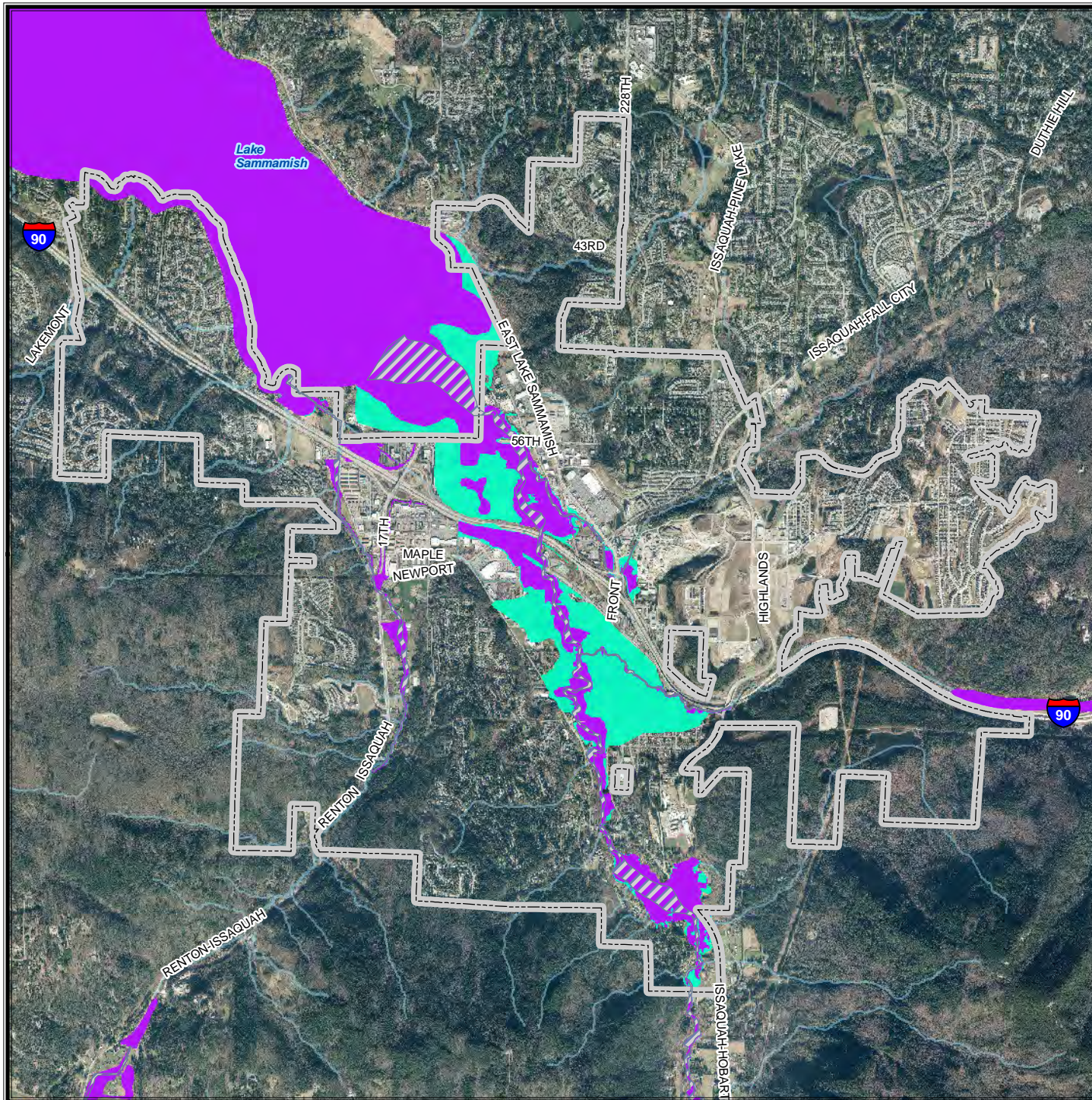
Magnitude: 7.2  
Epicenter: N47.52 W122.37

A ShakeMap is designed as a rapid response tool to portray the extent and variation of ground shaking throughout the affected region immediately following significant earthquakes. Ground motion and intensity maps are derived from peak ground motion amplitudes recorded on seismic sensors (accelerometers), with interpolation based on both estimated amplitudes where data are lacking, and site amplification corrections. Color-coded instrumental intensity maps are derived from empirical relations between peak ground motions and Modified Mercalli intensity.

Base Map Data Sources:  
King County, U.S. Geological Survey










# CITY OF ISSAQUAH

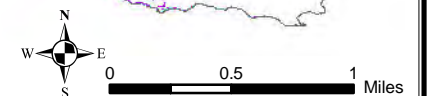
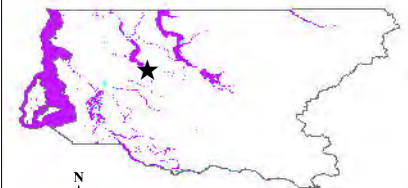
## FEMA DFIRM Flood Hazard Areas

-  Floodway
-  1 Percent Annual Flood Hazard
-  0.2 Percent Annual Flood Hazard

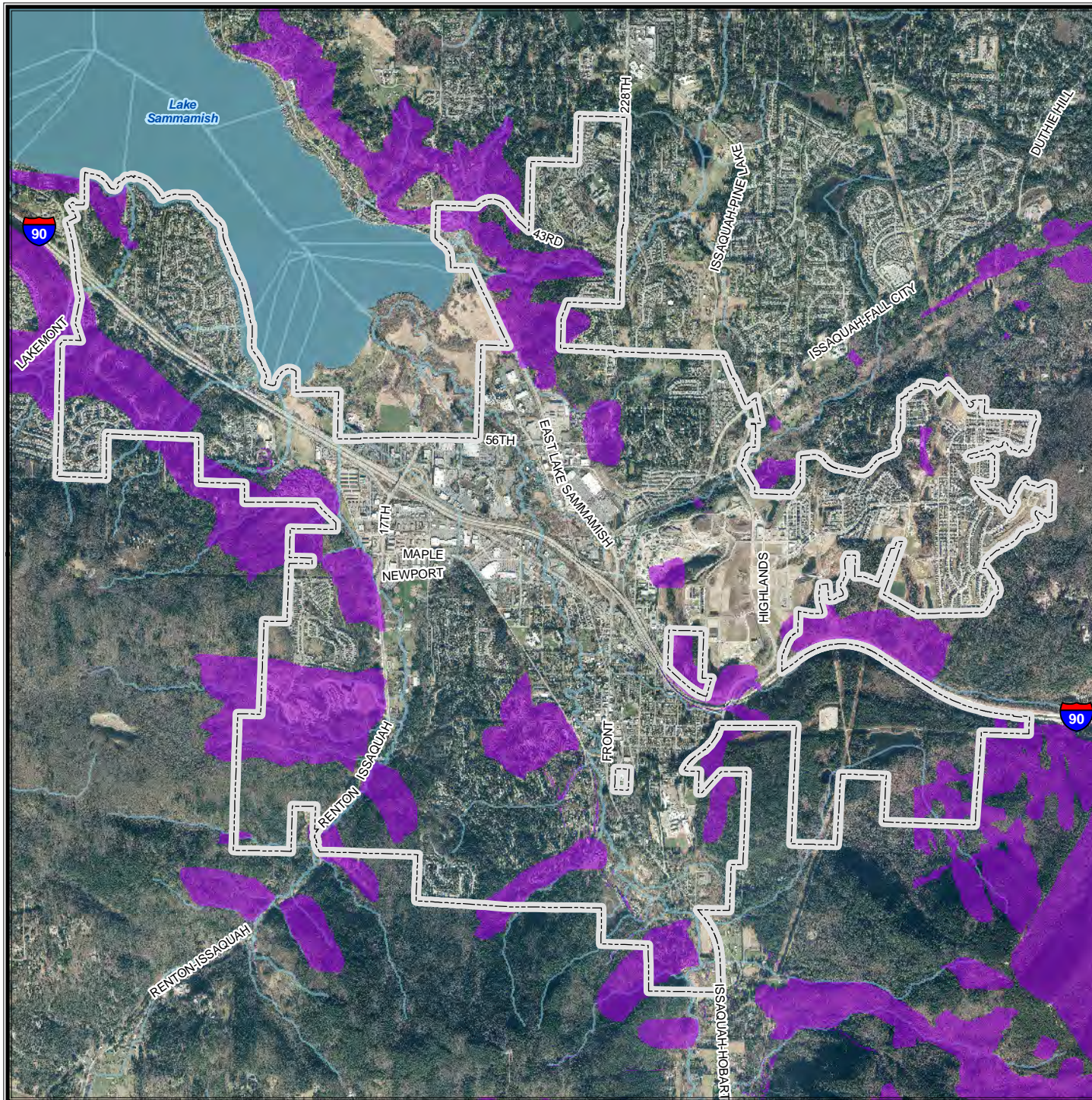
Flood hazard areas as depicted on draft FEMA Digital Flood Insurance Rate Maps (DFIRM).

The 1 percent annual flood hazard is commonly referred to as the 100 year floodplain. The 0.2 percent annual flood hazard is commonly referred to as the 500 year floodplain.

Base Map Data Sources:  
King County, U.S. Geological Survey







# CITY OF ISSAQUAH

## Landslide Hazard Areas

■ All Hazard Areas

The landslide hazard areas shown have been merged from three assessments for use for planning purposes:

WA DNR Landslide Areas data provided by the Washington State Department of Natural Resources, Division of Geology and Earth Resources. This dataset contains 1:24,000-scale polygons defining the extent of mapped landslides in the state of Washington, compiled chiefly from pre-existing landslide databases created in different divisions of the Washington State Department of Natural Resources to meet a variety of purposes.

King County Slide Areas - Landslide areas are areas subject to severe landslide risk identified in the Sensitive Areas Ordinance as:

A. Any area with a combination of:

1. Slopes greater than 15 %
2. Impermeable soils (typically silt and clay) frequently interbedded with granular soils (predominantly sand and gravel)
3. Springs or groundwater seepage.

B. Any area that has shown movement during the Holocene epoch ( from 10,000 years ago to present), or that is underlain by mass wastage debris of that epoch.

C. Any area potentially unstable as a result of rapid stream incision, stream bank erosion or undercutting by wave action.

D. Any area that shows evidence of, or is at risk from, snow avalanches.

E. Any area located on an alluvial fan, presently subject to or potentially subject to inundation by debris flows or deposition of stream-transported deposits.

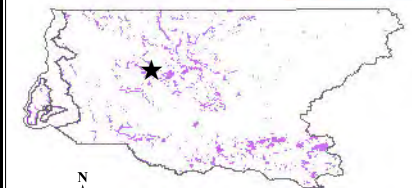
Slope/Soils Analysis:

1. Areas of slope greater than 40%. Slope determined using a DEM generated from 2002 LiDAR data. Slope data provided by King County DNRP.

2. Areas of Qf (alluvial fans), Qls (discrete landslides), and Qmw (colluvium and the cumulative debris from small indistinct landslides that accumulate on and at the base of unstable slopes) soils as identified in surface geology data provided by King County DNRP.

Base Map Data Sources:

King County, U.S. Geological Survey



0 0.5 1 Miles





# CITY OF ISSAQUAH

## 2008 LANDFIRE Fire Behavior Fuel Model

### Anderson 13 Fuel Classes

Burnable	Non-Burnable
FBFM1	Developed
FBFM2	Agriculture
FBFM3	Water
FBFM5	Barren
FBFM6	
FBFM8	
FBFM9	
FBFM10	
FBFM11	

Fuel Class data (LANDFIRE REFRESH 2008 (If\_1.1.0)) provided by the Wildland Fire Science, Earth Resources Observation and Science Center, U.S. Geological Survey. The LANDFIRE fuel data describe the composition and characteristics of both surface fuel and canopy fuel. Thirteen typical surface fuel arrangements or "collections of fuel properties" (Anderson 1982) were described to serve as input for Rothermel's mathematical surface fire behavior and spread model (Rothermel 1972). These fire behavior fuel models represent distinct distributions of fuel loadings found among surface fuel components (live and dead), size classes and fuel types. The fuel models are described by the most common fire carrying fuel type (grass, brush, timber litter or slash), loading and surface area-to-volume ratio by size class and component, fuelbed depth and moisture of extinction.

Base Map Data Sources:  
King County, U.S. Geological Survey

